

AUSTRALIAN ACANTHOCEPHALA, No. 9

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SUMMARY

1. An account is given of the larval stage of *Corynosoma clavatum* Goss from the mesentery of a fish, *Platycephalus fuscus*, South Australia.
2. *Micracanthocephalus hemirhamphi* Baylis is recorded from a South Australian garfish, *Hemirhamphus intermedius*.
3. *Moniliformis semoni* (Linstow) is described from eastern Australian bandicoots, *Isoodon torosus*, *I. obesulus* and *Perameles nasuta*.
4. The large acanthocephalan recorded from introduced species of *Rattus* in Australia is regarded as *Moniliformis dubius* Meyer.

We are indebted to Dr. E. A. Derrick, Institute of Medical Research, Brisbane, for material from bandicoots, *Isoodon torosus*, and from rats from south-eastern Queensland. The remainder was collected by the senior author. Mr. W. A. Rainbow, Australian Museum, Sydney, kindly sent us a photograph of Linstow's figures of *Moniliformis semoni*. All measurements given in this paper, unless otherwise stated, are for worms cleared in methyl salicylate. Specimens of the parasites have been deposited in the South Australian Museum.

CORYNOSOMA CLAVATUM Goss (encysted). *Platycephalus fuscus*, St. Vincent Gulf, S. Aust.

MICRACANTHOCEPHALUS HEMIRHAMPHI Baylis. *Hemirhamphus intermedius*, Port Willunga, S. Aust.,

MONILIFORMIS SEMONI (Linstow). *Isoodon obesulus*, Sydney, N.S.W.; *Isoodon torosus*, S.E. Qld; *Perameles nasuta*, Gosford, N.S.W..

MONILIFORMIS DUBIUS Meyer. *Rattus rattus*, Brisbane, Sydney; *Rattus norvegicus*, Brisbane, Sydney.

CORYNOSOMA CLAVATUM Goss Fig. 1-3

About twelve larval specimens of *Corynosoma clavatum* Goss (1940) were found attached to the mesentery of a flathead, *Platycephalus fuscus*, caught in St. Vincent Gulf, South Australia, in November 1933. The worms were removed in the encysted form from the fish and the proboscis of all became wholly or partly everted when the organisms were placed in fresh water. Some of the parasites came completely out of their cyst walls. We have had to rely on the size and spination of the proboscis for our identification of the specimens.

The length of the proboscis is 0.69-0.75 mm. and its maximum width is 0.30-0.32 mm. It is armed with 16 rows, each of 10 hooks. The anterior six hooks of each row are larger and bear rooting processes. The size and shape of some of them is shown in fig. 3. The proboscis sheath is double-walled and about 1.0 mm. long.

There is a neck, 0.59-0.70 mm. long and 0.22-0.51 mm. wide at its base. The length of the body of the parasites (measured from the base of the neck) is 2.1-2.6 mm.; and the maximum width is 1.0-1.5 mm. The anterior portion of the body bears numerous small spines. The genital aperture of the completely freed worms is surrounded by a few very small spines.

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C. clavatum has now been reported from a number of hosts in Australia. The adult form was described by Goss (1940) from shags, *Phalacrocorax varius*, *P. melanoleucus* and *P. ater* from Western Australia. In South Australia the adult has been reported by Johnston and Best (1942) from *P. varius* and from a seal, *Gypsophoca dorifera*.

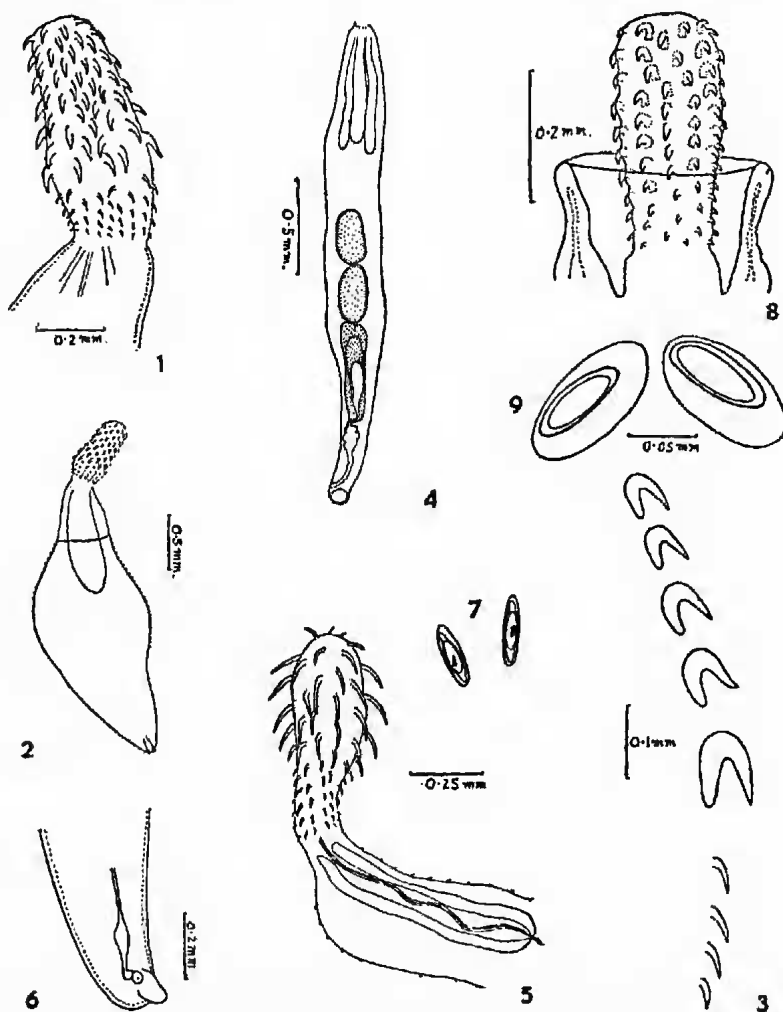


Fig. 1-3—*Corynosoma clavatum*: 1, proboscis of larva; 2, larva; 3, some proboscis hooks. Fig. 4-7—*Micracanthocephalus hemirhamphi*: 4, body of male; 5, proboscis; 6, posterior region of female; 7, eggs. Fig. 8-9—*Moniliformis dubius*: 8, proboscis; 9, eggs.

MICRACANTHOCEPHALUS HEMIRHAMPHI Baylis. Fig. 4-7

One male and two female specimens of this parasite were found in the intestine of a garfish, *Hemirhamphus intermedius*, caught at Port Willunga, South Australia, in March 1934. The proboscis of only one specimen, a female, was in a sufficiently satisfactory condition for measuring.

The male specimen is slightly flattened. The length of the body is 2.8 mm. and its maximum width 0.35 mm. The proboscis sac is 0.7 mm. long. Two

testes, arranged in tandem, may overlap each other but not the proboscis sac. The cement glands are pressed closely together and we have been unable to determine their number. The genital aperture is subterminal. There are two lemnisci, each a little larger than the proboscis sac. The anterior region of the body bears about 14 or 15 transverse rows of spines.

The body length of the females is 4.0-4.9 mm. and the maximum width 0.44-0.70 mm. The proboscis, 0.57 mm. long and 0.20 mm. wide, is bent almost at right angles to the body. It is armed with 12 rows of 11 hooks per row (fig. 5). The proboscis sac is 0.70 mm. long and its width is 0.11 mm. In both female specimens there is a finger-like appendage near the genital aperture. The posterior region of the body of our specimen is not sharply bent so as to form a hook as reported by Baylis. The genital aperture is lateral rather than subterminal. Ellipsoidal eggs are 58-60 μ long and 18-20 μ wide.

Macracanthocephalus hemirhamphi was described by Baylis (1944) from the same host species, *Hemirhamphus intermedius*, from Otago, New Zealand.

MONILIFORMIS SEMONI (Linstow). Fig. 10-17

Many specimens of this species from bandicoots, *Isododon lorosus*, from Wooubye, Nambour and Cowan Cowan, south-eastern Queensland, were sent to us for identification by Dr. E. H. Derrick.

The parasites are long and either cylindrical or somewhat flattened. The body shows external pseudo-segmentation and at first sight looks like that of a cestode. The width of the worm gradually increases towards the posterior region and in the male is greatest in the region of the testes. The length of the male is 4.6-4.8 cm.; that of the female 10.4-14.0 cm. The maximum width of the male is 2.0 mm., and of the female 1.9 cm.

The small flask-shaped proboscis consists of an armed portion, 0.46-0.56 mm. long, and a short unarmed portion, 0.15-0.17 mm. long. The width of the proboscis anteriorly is 0.26-0.30 mm., and posteriorly 0.17-0.22 mm. It seems most likely therefore that the length of the organ given by Linstow, *viz.*, 0.7 mm., is that of the combined length of the armed and unarmed portions. How to describe the arrangement of the proboscis hooks has proved difficult. There are 12 rows of hooks, each row consisting of three larger anterior hooks arranged longitudinally and provided with strong rooting processes, followed by 10-12 smaller and more slender hooks arranged spirally, *i.e.*, there are 12 rows of about 13-15 hooks per row. In some rows the posterior hooks are arranged somewhat irregularly. Linstow described the species as possessing 21 transverse rows each of 6 hooks, and Meyer has suggested 12 rows of 10-11 hooks. Neither of these descriptions seems to us to be satisfactory. The number of hooks is greater than that given by these two workers.

The maximum length of the double-walled proboscis sheath is 1.2 mm. and its maximum width 0.4 mm. An elliptical ganglion is situated at its base. There are two long coiled lemnisci. The body wall is thick and appears to contain only one collecting vessel in the lacunar system.

Two elliptical testes of approximately equal size are situated in the posterior region of the male. Their maximum length is 3.8 mm. and width 1.4 mm. The cement glands are elliptical or flask-shaped and are closely packed together. In two specimens they overlap the posterior testis, but this may have occurred during fixation. The glands in our specimens are so tightly pressed together that we were unable to determine directly their number. The ducts from the cement glands, however, do not fuse but run separately to the bursa. In some males the

posterior region is flexed and flattened at about the level of the cement glands. Saeffligen's pouch is about 1.7 mm. long. There are well-developed penis and bursa. The genital aperture is terminal.

The female genitalia, consisting of uterus and vagina, are about 1.0 mm. long in the adult. The vagina is a short, stout structure. Eggs mounted in Canada balsam are 70-80 μ long and 32-36 μ wide.

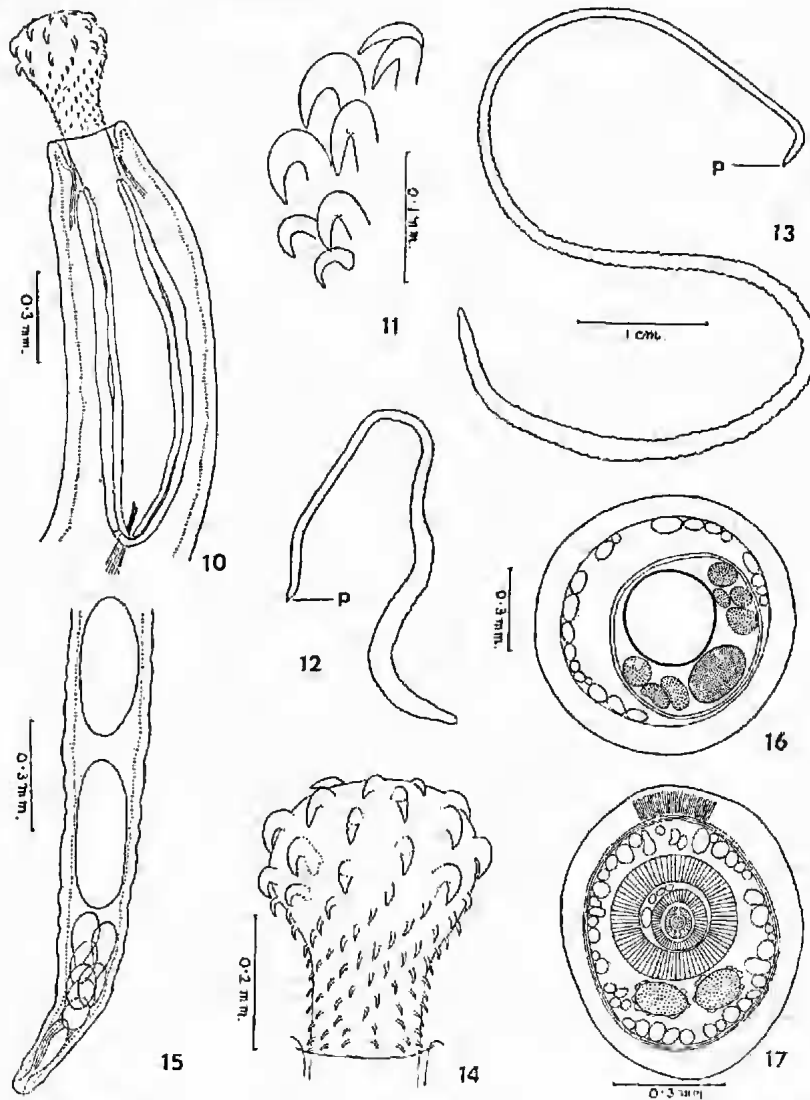


Fig. 10-17—*Moniliformis semoni*: 10, anterior region; 11 some proboscis hooks; 12, adult male; 13, adult female; 14, proboscis; 15, posterior region of male; 16, T.S. through cement ducts; 17, T.S. through proboscis sac. Fig. 12 and 13 are drawn to same scale.

Systematic position

This species was described as *Echinorhynchus (Gigantorhynchus) semoni* by Linstow (1898, 469-471), from *Perameles obesulus* from the Upper Burnett River region in south-eastern Queensland. Porta (1908) and Johnston (1909, 521) transferred it to *Gigantorhynchus*, the latter recording the parasite from

the same host species, *Isodon obesulus*, from Sydney. Johnston (1911, 50; 1910, xvii) also reported the presence of *Gigantorhynchus* sp. (? *G. semoni*) in *Perameles nasuta* from Gosford, New South Wales; and *Gigantorhynchus* sp. in *Phascogale penicillata* in New South Wales (1910, xvii; 1911, 50). The material from *P. nasuta* belongs to *M. semoni* and that from *Phascogale* probably belonged to the same species. Travassos (1917, 25) transferred the species to *Prosthenorchis*. Johnston and Deland (1929, 146) left it under *Gigantorhynchus*. Meyer (1932) placed it in an appendix to the Moniliformidae. We consider that the species belongs to *Moniliformis*.

MONILIFORMIS DUBIUS Meyer. Fig. 8-9

About 25 specimens of an echinorhynch identified by us as *Moniliformis dubius* Meyer 1932 were examined. The material was collected from *Rattus rattus* and *R. norvegicus* by Dr. Derrick from Brisbane and by the senior author from rats at Brisbane and Sydney. We were unable to notice any significant difference between the material from the different hosts.

The worms are long and usually moniliform. The length of the males is 2.8-4.2 cm., and of the females 2.0-16.4 cm. The maximum width of the male is about 1.5 mm., and of the female 2.3 mm., excluding the flattened specimens. The proboscis of most specimens is almost cylindrical, but in a few specimens it is rather club-shaped. It varies rather considerably in length, being 0.42-0.53 mm. long, and consisting of an armed portion 0.36-0.48 mm. in length and a small unarmed portion 0.03-0.07 mm. long. Its maximum width is 0.17-0.19 mm. The proboscis is armed with 12 longitudinal rows of hooks, 10-11 hooks per row. The size, shape and arrangement of these hooks is shown in fig. 8.

The proboscis sheath is sac-like, about 0.7 mm. long and bears spiral striations. The lemnisci may be 3.5 mm. in length. Two testes, 1.7-2.5 mm. long and 0.40-0.65 mm. wide, lie in the posterior region of the male. The cement glands are pressed closely together and the male genital aperture is terminal. Van Cleave (1924), when describing the eggs of his *M. moniliformis*, which according to Meyer (1932) and Chandler (1941) is synonymous with *M. dubius*, says: "The outer embryonic membrane is not a firm, highly resistant shell, such as is found in most species of Acanthocephala. On the contrary, it is rather delicate and subject to much distortion." This describes exactly the condition noticed in the eggs of most of our specimens. The outer membrane is 109-118 μ long and 46-57 μ wide. Within this membrane lies a thicker elliptical shell, 76-84 μ long and 30-38 μ wide.

After studying a large number of moniliform Acanthocephala collected from rats in different parts of the world, Van Cleave (1924) came to the conclusion that the material which he had examined was identical with that of *M. moniliformis* (Bremser 1811). He redescribed the species and extended the range of measurements of some organs.

Meyer (1932) recognised three closely-related species of moniliform Acanthocephala from rodents:—(1) *M. moniliformis* (Bremser 1811); (2) *M. dubius* (syn. *Moniliformis* sp. Chandler 1921; and *M. moniliformis* Van Cleave 1924); and (3) *M. travassosi* (syn. *M. moniliformis* Travassos 1917). In addition he admitted three geographical variations within the species *M. moniliformis* (Bremser).

Chandler (1941) considered that his *Moniliformis* sp. from the Texas rat was synonymous with *M. dubius* Meyer 1932, i.e., that the name *dubius* was valid. He went on to say that in his opinion *M. travassosi* Meyer 1932 was synonymous with *M. dubius*.

Our study of a limited number of specimens, unfortunately, does not help much towards solving the problem of the number of valid species. The dimensions of the proboscis of our specimens lie between those of *M. moniliformis* (Bremser) and *M. dubius* Meyer. As the number and arrangement of the proboscis hooks and the size and shape of the eggs of our specimens are similar to those of *M. dubius*, we have placed our parasites under *M. dubius*. The parasite recorded as *Hormorhynchus moniliformis* by one of us from rats in Sydney, Brisbane and North Queensland (Johnston 1909; 1912; 1913; 1918) is also *M. dubius*.

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